**OFFICE OF FINANCIAL MANAGEMENT**

STATE OF WASHINGTON

# LOSS PREVENTION REVIEW TEAM

## DOLLIVER BUILDING INCIDENT OF SEPTEMBER 21, 2003

## Report to the Director of the Office of Financial Management

April 2004

Visit the Loss Prevention Review Team website at
http://www.ofm.wa.gov/rmd/lprt/loss.htm

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## APPENDICES

# LOSS PREVENTION REVIEW TEAM

## DOLLIVER BUILDING INCIDENT

## SECTION I – EXECUTIVE SUMMARY

### CONTEXT

In accordance with RCW 43.41.370, Marty Brown, Director of the Office of Financial Management (OFM) is authorized to appoint a loss prevention review team when an incident resulting in death, serious injury to a person or other substantial loss is alleged or suspected to be caused at least in part by a state agency. Mr. Brown determined that this reported incident should be reviewed by a loss prevention review team (LPRT).

### INCIDENT SUMMARY

Sunday evening, September 21, 2003, at approximately 8:00 pm a chilled water system hose burst above the first floor of the Dolliver Building. ACE Security (a contract service) notified the Department of General Administration (GA) powerhouse staff around 9:00 pm that a fire alarm was showing a malfunction. GA staff was not in the practice of responding to all after hour trouble alarms so powerhouse staff did not contact a first responder.

The Dolliver Building houses the Corporations Division of the Secretary of State's Office (SEC). When SEC staff arrived at 7:00 am the next morning, Monday September 22, they discovered several inches of water on the first floor and basement floor. It was estimated that several thousand gallons of water had flowed out damaging furniture, computers, electrical and telephone systems and paper files in storage areas. The water was shut off and restoration began immediately.

The total damage estimate for both building and contents is between $325,000 and $425,000.

## REVIEW PROCESS

On November 19, 2003, Marty Brown appointed Jim Vane from the Department of Information Services, LaVern Todd from the Office of Financial Management and Le Perry from the Attorney General's Office to serve as members of the Loss Prevention Review Team (LPRT) assigned to review the Dolliver Building incident. Nancy Heyen, from the Office of Financial Management, was assigned to act as the LPRT Coordinator. The team's task was to review the incident, evaluate the causes and make recommendations regarding GA's policies and procedures in an attempt to prevent or mitigate future losses of this type.

The LPRT held it's first meeting on December 1, 2003. The LPRT Coordinator explained the process and assisted the team in developing a review plan. The LPRT members conducted a site visit of the Dolliver Building on December 8, 2003. The team interviewed GA and SEC staff members on January 26, 2004 and February 25, 2004.

## FINDINGS

Due to financing requirements the Dolliver Building has commercial property insurance in place with a $250,000 per occurrence deductible. However, the contents owned by SEC were not insured.

The property insurance carrier hired GT Engineering to do a post incident investigation. Robert Clark from GT Engineering performed a site visit to assess the cause of loss and take parts of the machinery back to his lab for analysis.

Mr. Clark described the incident as the "perfect storm" meaning that more than one factor combined contributed to the failure of the system. In summary multiple factors arising out of construction defects and product failure caused the system to fail.

Ace Security contacted the GA powerhouse staff to report a malfunction of a fire alarm. However, since the alarm was only showing "trouble" GA did not send a first responder to investigate. It was later determined that the leaking water shorted out the fire alarm system causing it to send a trouble alarm.

## RECOMMENDATIONS

1. An analysis to improve alarm systems and response procedures should be conducted by GA.

2. Proper commissioning of the HVAC system in the Dolliver Building was never done. By definition commissioning is the act of putting equipment into service. During commissioning of an HVAC system all pieces and integration of pieces are checked out under a start up procedure. GA should develop a policy regarding proper commissioning of all HVAC systems after installation or when there has been a significant change.

3. A written policy should be established for doing after incident reviews on losses of this size.

4. When possible all GA owned building alarm systems should be updated and centralized for better monitoring.

## SECTION II – REVIEW PROCESS

### TEAM MEMBERS

In accordance with RCW 43.41.370, Marty Brown, Director of the Office of Financial Management (OFM) is authorized to appoint loss prevention review teams when he deems that an incident merits review. On November 19, 2003 Mr. Brown appointed the following people to review the Dolliver Building water loss:

- LaVern Todd, Facility Administrator Office of Financial Management;
- Le Perry, Facilities Manager, Office of the Attorney General; and
- Jim Vane, Manager, Facility Services, Department of Information Services

### REVIEW PROCEDURE

The LPRT first met on December 1, 2003. The discussion included team objectives, plan development, final report format and roles of the team members and LPRT Coordinator.

The team conducted a site visit to the Dolliver Building on December 8, 2003. They met with GA staff and inspected the failed HVAC system and resulting damage.

The team met to conduct investigative interviews on January 26, 2004 and February 25, 2004.

## INVESTIGATIVE INTERVIEWS

The following people were interviewed:

| Name | Agency/Title | Interview Date |
|---|---|---|
| Steve Jones | GA, Building Manager | January 26, 2004 |
| Dave Bebich | GA, HVAC Technician | January 26, 2004 |
| Hans Dettling | SEC, Administrative Assistant | January 26, 2004 |
| Brian Riley | GA, Incident Commander | January 26, 2004 |
| Chet Higgins | GA, Maintenance Operations Manager | January 26, 2004 |
| Bill Moore | GA, Assistant Director | February 25, 2004 |
| Ron Noble | GA, Building Support Systems | February 25, 2004 |

The LPRT members had prepared questions for the interviewees in an effort to determine the cause of the loss, the quality of response to the loss and future mitigation efforts. Examples of questions asked are included (Appendix D Interview Questions).

On February 25, 2004, the LPRT began to develop recommendations based on the investigative interviews and the report done by GT Engineering.

The LPRT Coordinator sent a draft of the report to members in March of 2004, for the members review and comments. The report was finalized in April 2004.

## SECTION III – FINDINGS

### CAUSE OF LOSS

The after incident investigation done by GT Engineering reveals the following:

- BiWell Construction failed to install a pressure relief valve stipulated in the plans for the HVAC system. It is likely that this would have prevented or mitigated the loss. (See Appendix A Pump System Diagram).
- The mechanical design engineer should have checked the system prior to start up which could have detected the missing valve.
- The system was designed to include a surge tank, which would compensate for pressure surges. The after incident investigation by GT Engineering revealed that the surge tank was defective and non functional at the time of loss.

The GT Engineering staff described the incident as the "perfect storm" meaning that more than one factor combined contributed to the failure of the system and the ensuing loss. The LPRT members felt that lack of proper commissioning during start up was a key cause of the loss.

### RESULTING LOSS

Building/Staff Time – Damage to the structure included electrical, telephone system, carpet and sheet rock. Expended GA staff time is also part of the overall loss. At the writing of this report the amount of the building loss including staff time was estimated to be between $250,000 - $300,000.

Contents/Staff Time – Damage to the contents of the building, which was owned by the Secretary of State's Office included damage to office equipment and paper documents. Staff time was also part of the loss. At the writing of this report the amount of the contents loss including staff time was estimated to be between $75,000 - $125,000.

Due to financing requirements the Dolliver Building has commercial property insurance in place with a $250,000 per occurrence deductible. The contents loss to the SEC was not insured.

## POLICIES AND PROCEDURES

The Dolliver Building alarm system was monitored by Ace Security (a contract security company). Ace received an alarm that indicated at least one of the fire alarms in the Dolliver Building had malfunctioned. The practice for after hour incidents was to have Ace report the finding to the GA powerhouse staff. The powerhouse staff would then either contact a person who was acting as first responder or just log the incident without contacting the first responder.

The LPRT's findings showed that the powerhouse received the call and did not contact a first responder (See Appendix B Incident Report). During interviews it was explained by GA personnel that it is not reasonable for GA staff to respond to all such calls. Many calls are generated by alarm contamination at facilities that are under construction. Some alarm causes are unable to be explained. Over the last few years staff cuts have caused GA to limit the number of responses.

## EMERGENCY RESPONSE AND AFTER INCIDENT REVIEW

SEC employees discovered the water damage when they arrived for work on Monday morning, September 22, 2003. The Department of Capital Facilities Customer Service Center was called and a team was dispatched. The team included the building manager, maintenance staff and environmental response members. GA contacted the Olympia Fire Department for assistance to pump water out of the building. Service Master (contractor) was also notified to begin restoration.

The LPRT investigation revealed that no formal after incident review was done by GA regarding this incident.

## SECTION IV - RECOMMENDATIONS

### RESPONDING TO ALARMS

It appears that at some point GA made a policy decision not to respond to all trouble alarms after hours due to limited staff and the effort to control overtime costs. There are numerous fire panels and HVAC systems on the Capital Campus. Alarms can be generated due to dirt; moisture or shorting for other reasons and in some cases the cause of the trouble alarm cannot be diagnosed. The fall and winter seasons usually generate more alarms due to moisture. GA records show that most alarms occur in and around construction areas due to contaminants getting into the fire alarms (See Appendix C Alarm Chart).

***Recommendation:*** GA should do an analysis of improving alarm systems and response procedures. A policy should be established that a responder investigates multiple alarms from the same location. It is possible that adding additional staff or staffing on different shifts could be used to do more frequent inspections and respond to alarms around the clock. Recent technology has improved communication between alarm systems and responders. Newer systems can alert a responder through a pager or cell phone and indicate more precisely the nature of the problem. GA could solicit agency tenants to see if their facilities staff or other staff would be willing to respond to such incidents within their building. This would provide more coverage for determining the severity of an incident.

### COMMISSIONING PROCESS

By definition commissioning is the act of putting equipment into service. During commissioning of an HVAC system all pieces and integration of pieces are checked out under a start up procedure. This helps to verify that the system meets the design requirements.

The LPRT investigation revealed that commissioning was never done on the Dolliver Building HVAC system. It was the team's understanding from the GA interviews that the commissioning was not done in order to save the cost.

***Recommendation:*** Commissioning should be done on all HVAC systems after installation or when significant changes have been made. The GT engineer, Robert Clark, was asked if commissioning would have identified the defects in the system.

He replied that it is likely that the defects would have been identified. He said that the mechanical design person should have detected the missing relief valves during a commissioning procedure. Critical life safety issues can also be identified through proper commissioning.

## IMPROVE AND IMPLEMENT AFTER INCIDENT REVIEW PROCESS

GA does have an after incident review process which is meant to analyze the cause and the quality of response. The process is a practice rather than a written policy.

The LPRT investigation revealed that an after incident response was not done for the Dolliver loss.

***Recommendation:*** GA should consider the existing after incident review process and determine how it could be improved. Such a process should be used after a loss of this size. There is often much to be learned in hindsight. The LPRT understood that doing after incident reviews is a practice for GA rather than a policy. Developing a written policy for after incident reviews would be beneficial.

## ANALYSIS OF ALL HVAC SYSTEM CONTROL CENTERS

Engineer, Robert Clark's report stated in his findings that the Dolliver HVAC system control could have been programmed to shut the system down before this loss occurred. Modern control systems can be programmed to detect excess pressure/heat and shut all or part of the system down to prevent such losses.

***Recommendation:*** GA should consider reviewing all HVAC systems to ensure that preventative programming and other precautionary steps have been taken. At the writing of this report the Dolliver system has been upgraded; however other GA owned buildings should also be reviewed.

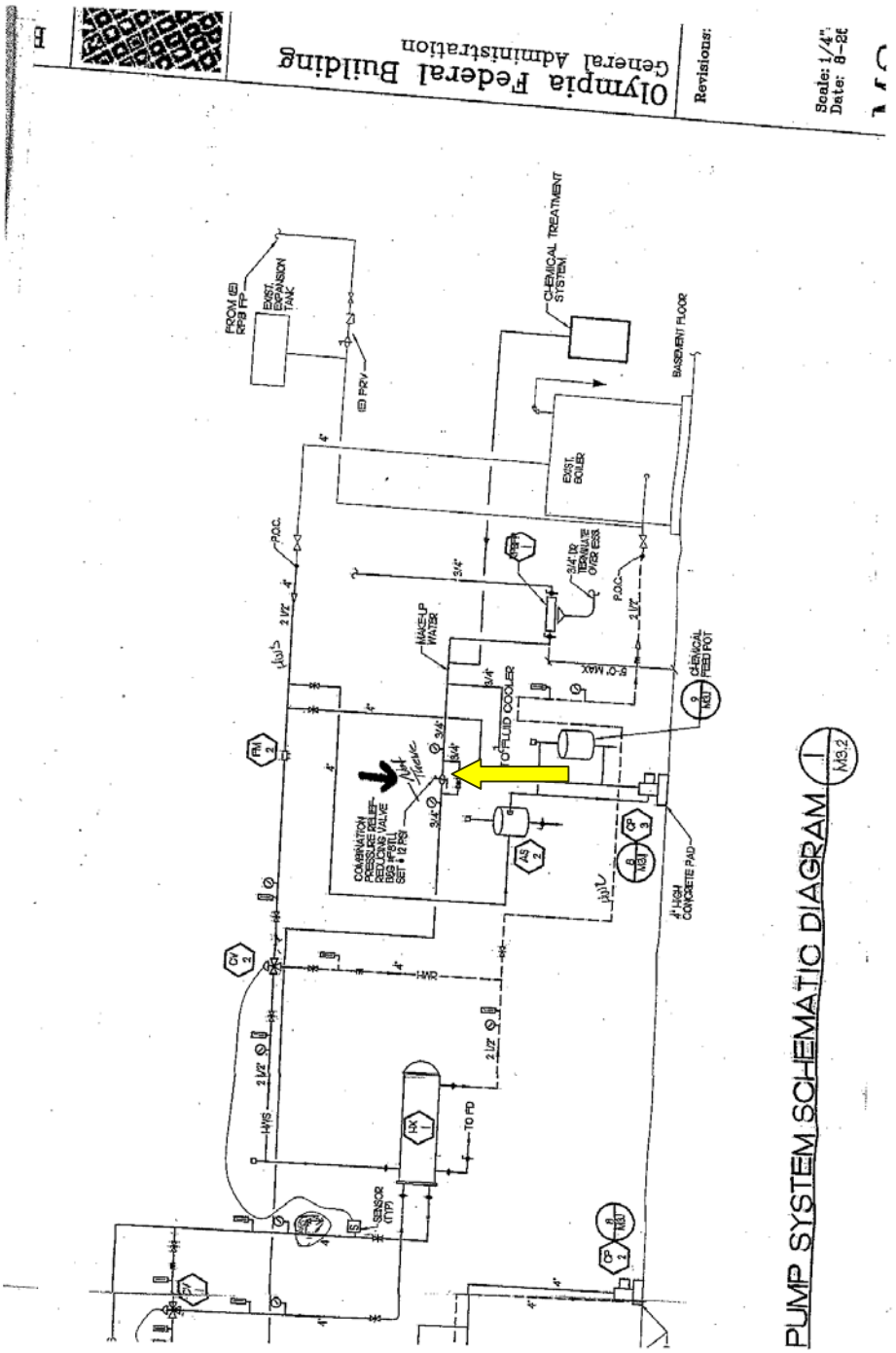
## UPDATE AND CENTRALIZE ALARM SYSTEMS

More than one GA staff member recommended that alarm systems for almost all state buildings could and should be more integrated and centralized for better monitoring. Although GA staff and the LPRT members acknowledged that this would be costly, all agreed that it would be the optimal method of keeping track of building systems.

***Recommendation**:* GA should do a cost/benefit analysis of updating and centralizing all building systems.

# APPENDICES

## APPENDIX A – PUMP SYSTEM DIAGRAM (ARROW SHOWS MISSING VALVE)



# APPENDIX B – GA INCIDENT REPORT

**Report Number:** 601 **Report Date:** 9/21/2003 **Report Time:** 22:12

**Caller Name:** OPERATOR 10 **Caller Phone #:** 456-1441

**Agency:** ACE SECURITY **Caller Location:** DOLIVER BLDG.

**Description of Incident:**
fire trouble and reset in bldg.

**Time of Incident:** 21:50

**Persons Contacted:**

STATE OFFICE OF RISK MANAGEMENT
2004 JAN 27 PM 3:04

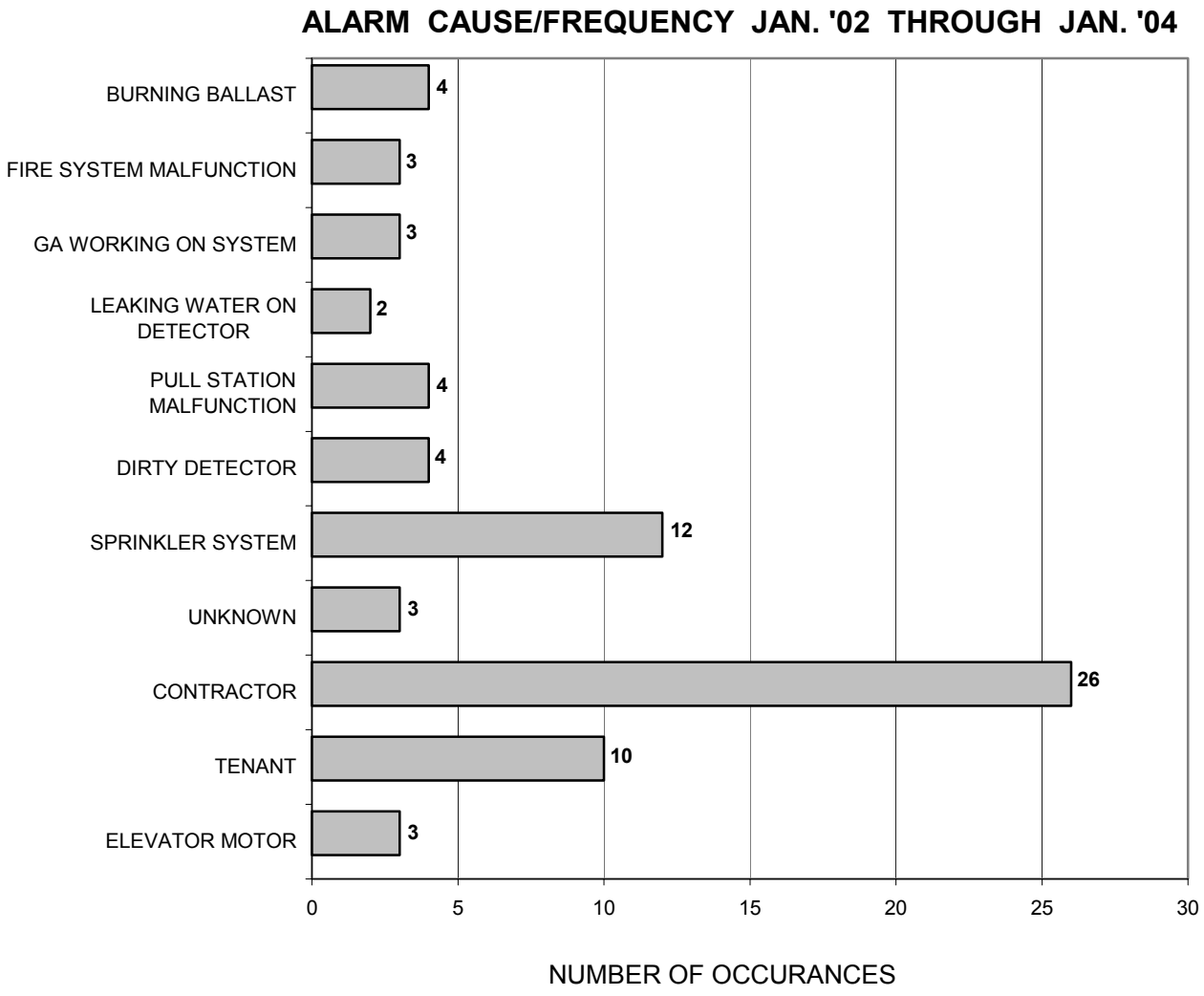
**First Responder Contacted:** NO **Arrival Time at Campus:** N/A

**Action Taken:**
noted trb. alarm

**Follow Up Action Required:**
needs to be checked in morning by bss. (Building Support Systems)

**Time Left Campus:** N/A **Copy Sent to State Patrol:** NO

# APPENDIX C – GA ALARM CAUSE CHART



# APPENDIX D – SAMPLE QUESTIONS FOR DOLLIVER BUILDING LPRT INTERVIEWS

1. Describe your involvement with the water loss that occurred at the Dolliver Building on September 21, 2003.

2. Was a commissioning process used prior to putting the Dolliver HVAC system in to use?

3. What system improvements could be made to the HVAC control system and alarm system to prevent or mitigate future losses of this type?

4. What human errors if any could have contributed to this loss?

5. What suggestions can you make to improve mechanical systems or policies and procedures that could prevent or mitigate future losses of this type?

6. Did GA do an internal post incident review on the Dolliver loss?

## APPENDIX E – OFM INCIDENT REPORT

Office of
Financial Management
State of Washington

# FORM FOR REPORTING INCIDENTS TO OFM

**This report is submitted to OFM for the sole purpose of fulfilling the notification requirement in RCW 43.41.370(4) as further described in the Guidelines for Reporting Incidents to OFM. This report is not an admission of fault nor has any determination of fault been made. The information reported is a brief summary of known facts at this time and is subject to change.**

**AGENCY NAME:**

| |
|---|
| **Office of the Secretary of State** |

**NAME OF PERSON MAKING REPORT:**

| |
|---|
| **Dan Speigle, Deputy Secretary of State (360) 570-5580 dspeigle@secstate.wa.gov** |

**DATE OF INCIDENT OR LOSS:**

| |
|---|
| **Incident started Sun. Sept. 21, 2003; continued to & detected Mon. Sept. 22, 2003** |

**NAME OF PERSON, DESCRIPTION OF INCIDENT OR LOSS:**

| |
|---|
| **At about 8:00 Sunday, Sept 21, 2003, a three-inch HVAC pipe burst between the first floor (Main level) and the second floor. The condition was detected Monday morning. About 1 inch of water accumulated on the main floor and 1-1/2 inch accumulated in the basement records storage room and telecommunications closet. The water had an anti-freeze agent in it, which makes it more likely to grow mold. The loss includes damage to the building (ceiling, drywall, carpet), telephone and electrical systems, electronic equipment, damage to records (which will need to be restored), loss of productivity, and loss of revenue.** |

**AGENCY CONTACT PERSON (Name, title, telephone number and email address):**

| |
|---|
| **Dan Speigle, Deputy Secretary of State (360) 570-5580 dspeigle@secstate.wa.gov** |

**HAS THE AGENCY CONVENED AN INTERNAL REVIEW PROCESS? IF YES, PROVIDE INFORMATION ON THE STATUS OF THE REVIEW:**

| |
|---|
| **This is a GA owned & managed building. We are working with them to determine what happened, the extent of the damage, why it wasn't detected earlier, whether the other sections/couplings of the HVAC water lines are secure, and to clean up/repair the damage.** |

## APPENDIX F – DAILY OLYMPIAN NEWSPAPER ARTICLE

# Pipe bursts in state building

Agency hopes insurance will cover estimated $500,000 in water damage

With the din of multiple air blowers in the background, Steve Jones, manager of the James M. Dolliver Building, glances back Monday at some of the damage resulting from a broken water pipe that soaked carpeting and damaged office equipment at the building on Capitol Way. The water also brought down a section of ceiling.

Steve Bloom/The Olympian

PATRICK CONDON THE OLYMPIAN

A water pipe that burst Sunday night flooded the first floor and part of the basement of the James M. Dolliver Building on Capitol Way in downtown Olympia. The building houses the Corporations Division of the Secretary of State's Office.

State property officials have estimated at least $500,000 in damage to electronic equipment, carpets, documents, Sheetrock and ceilings and other facilities and equipment. Department of General Administration Spokesman Steve Valandra said the agency hopes that insurance will cover most of the repairs.

The flooding completely wiped out the building's telephone systems, as well as a number of computers, printers and fax machines. Much of the damaged carpeting will need to be torn out, Valandra said, because it was contaminated by an antifreeze like fluid.

Officials think a pipe that supplied water to cool an HVAC system burst around 10 p.m. Sunday and leaked all night into an area between the first and second floor. At some point much of the first-floor ceiling caved in, swamping the first floor and allowing water to rush into the basement as well.

**Standing water greets workers**

"When workers arrived this morning, there was about an inch of standing water on the first floor," said Mike Ricchio, the director of the Corporations Division. Valandra said that in all, about 1,000 gallons of water spilled into the building.

The Olympia Fire Department was on the scene for a few hours Monday morning, helping to pump water out of the building. That work was later taken over by a private contractor.

About 60 employees work in the historic three-story building, which was the Olympia Post Office from 1915 to 1964. The building, named in honor of former state Supreme Court Chief Justice James Dolliver, has been occupied by the Secretary of State's office for about the past three years.

The second and third floors were not affected by the flooding, Ricchio said. About 20 of the building's workers will temporarily relocate to the Secretary of State's main office at 520 Union Ave.

Valandra said GA expects three to four weeks before the building is back to normal. Ricchio said about 40 to 50 customers visit the office every day, but he said many of those transactions can be accomplished through the division's Web site, which is at www.secstate.wa.gov/corps.

*The Corporations Division incorporates businesses in the state, as well as limited liability partnerships, limited partnerships, and it registers trademarks.*

# APPENDIX G – SUMMARY OF INSPECTION DONE BY GT ENGINEERING

**Summary of HVAC system inspection at Dolliver Building, September 30, 2003**

GT engineering examined several heat pump installations in the ceiling above the first floor, including the #2 unit which had experienced a rupture in a metal braided hose on September 21, 2003. We also inspected the boiler room where a test of the expansion tank was conducted at our request. The hydronic loop control system was discussed with the designer, and we requested and witnessed information that the data acquisition associated with the control system recorded.

Present at the time of our inspections were:

1. Mr. Nick Cockrell, the project manager and Facility Asset Manager for the State who oversaw original remodel construction and installation of the HVAC system. Mr. Cockrell provided background on the system design and the various parties involved.

2. Mr. Guy Winkelman, the current Facility Asset Manager (he recently inherited this responsibility from Cockrell).

3. Mr. Dean Houghton – Engineering Specialist with Siemens Building Technologies, Inc. Mr. Houghton (Siemens; siemens-Staefa) apparently designed and supplied the control system for the failed hydronic heating loop.

4. Thane (first name) – The technician with Sunset Air. Sunset Air has the maintenance contract and Thane is the person who has done all of the on-site maintenance on the system.

5. Mr. Steve Jones, State of Washington, Building Manager.

6. Mr. Brian Welsh – Keithly Welsh Associates, retained by the State to recommission the building. Appears to have hydronic installation expertise.

What we discovered:

1. The hydronic system was operating in the cooling mode at the time of failure. Approximately one day prior to the failure (this was a hot weekend) the temperature on the system started to increase. Nominal operating temperature is around 75F; this had reached 110F at the time of failure.

2. Subsequent to the hose failure, Dean Houghton found that the Siemens system control cards were ‘fried’. These cards had gotten wet from water that came down the conduit from the failed hose location. Dean was able to electronically communicate with the ‘fried’ cards except for the card that controlled the cooling

tower. After replacing the cards, he was able to restart the system. However, the fan unit on the cooling tower had tripped a local circuit breaker. Dean was able to manually reset the circuit breaker and the system was functional at the time of our inspection.

3. Manufacturer of the failed hose (incase a defect is determined). The only current identification is Euroflex (part of the original installation).

4. HVAC system designer
   a. Lack of positive pressure relief
   b. Lack of control protection against over-pressurization

5. Need to determine why the cooling tower fan motor relay tripped – if there is an electrical issue with the fan or the protective devices (relay or thermal sensor on fan). The motor may have tripped due to overheating (hot weather, continuous use) though system design should generally preclude this.

Evidence:
At this time GT engineering has
a. The failed hose
b. The original (failed) circuit boards replace by Siemens
c. Requested preservation of the broken pressure gages.
d. Requested preservation of any other braided hoses removed from the HVAC system for examination. (We specifically want the second hose on Unit 2)

Future Actions:
1. The Extrol expansion tank <u>should not be repaired</u> until Extrol is put on notice. Upon repair, the failed bladder should be preserved as evidence. – Putting in a new one – ok on the old one.
2. Determine the condition of the thermal protective devices in the cooling tower.
3. Determine whether the Siemens cooling tower electronic control module failure led to over-pressurization, or if this card failed as a result of the hose leak.
4. Examine accident-failed hose to determine cause (this can only be nondestructive until all parties are notified).
5. Examine other hose(s) removed from the hydronic heating system to assess whether they may have been damaged due to over-pressurization.
6. GT Engineering is to receive copies of the Siemens control system originated condition monitoring data for the few days preceding the accident up until the time of the accident (Dean Houghton to supply).

# APPENDIX H – DOCUMENT LOG

**Name of Team Member:** Nancy Heyen, LPRT Coordinator

**Incident Being Reviewed:** Dolliver Building Water Loss, DOL 9/21/03

**Dates of Review:** January 2004 to April 2004

| APPENDICES ITEM | DATE REC'D | FROM WHOM | BY WHOM | DESCRIPTION OF DOCUMENT |
|---|---|---|---|---|
| Appendix A | 12/10/2003 | Bob Haggerty Crawford Co. | Nancy Heyen | Pump System Diagram |
| Appendix B | 1/27/2004 | Chet Higgins GA | Nancy Heyen | GA Incident Report |
| Appendix C | 3/19/2004 | Bill Moore GA | Nancy Heyen | Alarm Cause Chart |
| Appendix E | 9/25/2003 | Dan Speigle SEC | Susan Hettinger | OFM Incident Report |
| Appendix G | 12/10/2003 | Bob Haggerty Crawford Co. | Nancy Heyen | Summary of GT Engineering Dolliver Inspection |
| Appendix I | 12/10/2003 | Bob Haggerty Crawford Co. | Nancy Heyen | Dolliver Loss Photos |

## APPENDIX I - LPRT PHOTOS FOR DOLLIVER BUILDING LOSS

**DOL 9/21/2003**

**Photo # 1 - Catwalk above first floor of the Dolliver Building. HVAC metal braided flex hose burst at this level.**

**#1 – Catwalk**

**Photo # 2 - Wet carpet on floor one of the Dolliver Building. Carpet was glue-down type and all wet carpet had to be replaced.**

# #2 - Wet Carpet

**Photo # 3 - Wet boxes in file room on first floor. Records that were stored in cardboard boxes were damaged.**

## #3 - File Room – Wet Boxes

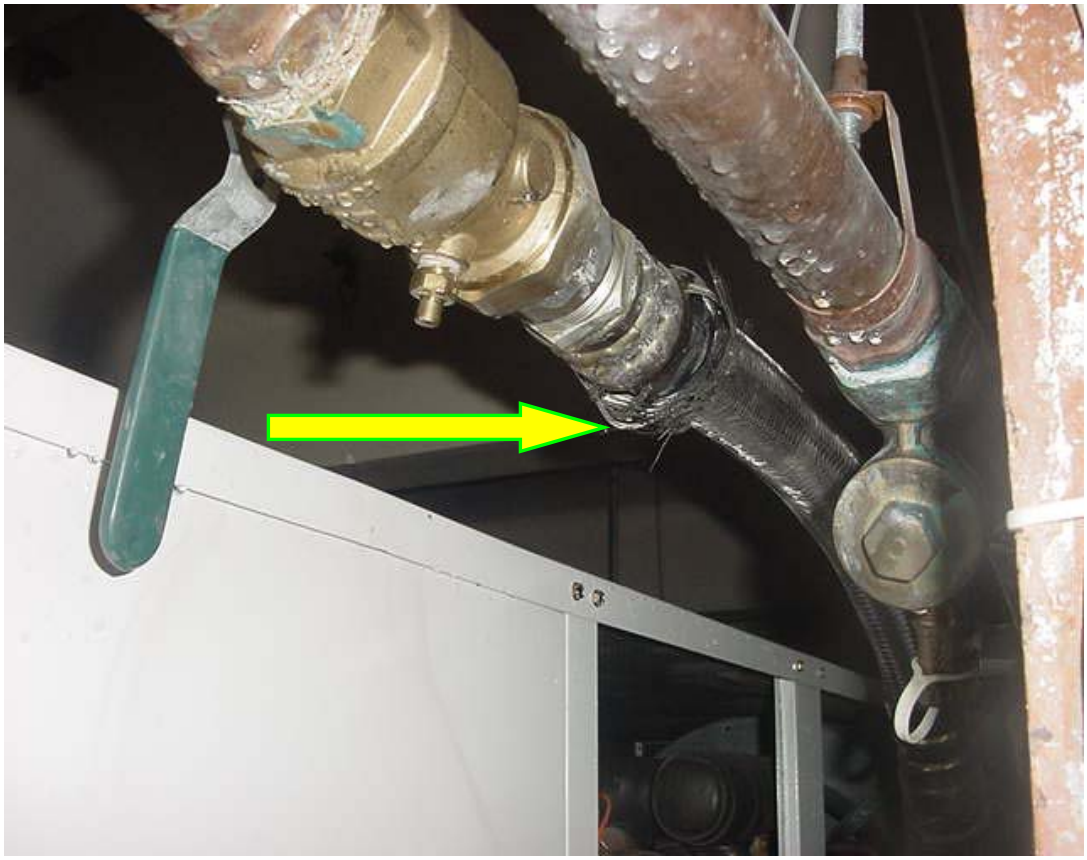
**Photo # 4 - Ceiling damage first floor.**


# #4 – Ceiling Damage

**Photo # 5 - Wet boxes in basement.**


# #5 – Wet Boxes

**Photo # 6 - Metal braided flex hose burst away from crimp fitting.**



# #6 - Broken Flex Hose

**Photo # 7 - Wet file boxes in basement.**

# #7 – Wet File Boxes

WASHINGTON STATE OFFICE OF FINANCIAL MANAGEMENT
INSURANCE BUILDING ◆ PO BOX 43113
OLYMPIA, WA 98504-3113 ◆ (360) 902-0555 ◆ FAX (360) 664-2832